

### Remarks

The Final Office Action dated July 22, 2010 lists the following objection and rejections: claims 15-18 and 21 are objected to due to informalities; claim 21 stands rejected under 35 U.S. C. § 112(1); claims 5-6, 10 and 21 stand rejected under 35 U.S.C. § 112(2); claims 1, 4-7, 9-10, 12-19 and 21 stand rejected under 35 U.S.C. § 103(a) over the Omura (EP 1168455); claims 2 and 11 stand rejected under 35 U.S.C. § 103(a) over the '455 reference in view of Onda *et al.* ("SIC Integrated MOSFETs" Physica Status Solidi (A), Applied Research, Berlin, DE, vol.162, no. 1, 16 July 1997, pages 369-388); claims 3 and 20 stand rejected under 35 U.S.C. § 103(a) over the '455 reference in view of Miyano *et al.* (JP 403211885); and claim 8 stands rejected under 35 U.S.C. § 103(a) over the '455 reference in view of Hshieh *et al.* (U.S. Patent Pub. 2001/0003367). Applicant traverses the objections and rejections, and does not acquiesce to any rejection or averment in this Office Action unless Applicant expressly indicates otherwise. Applicant's previous arguments are incorporated herein by reference.

Applicant traverses the § 103(a) rejections because the Office Action has failed to provide a *prima facie* case of obviousness and because, as implicitly admitted by the Examiner, the '455 reference teaches away from the Examiner's proposed modifications. As discussed in more detail below, the Examiner, both in the rejection and the response to Applicant's previous arguments, continually ignores a fundamental flaw in the Examiner's position. Specifically, the Examiner relies on a motivation of routine experimentation and optimization to achieve a "desired device performance," despite providing no indication of what desired performance one skilled in the art would be attempting to achieve that would result in a hypothetical embodiment consistent with Applicant's claimed invention. Instead, the '455 reference teaches the relationship of the optimal or preferred thicknesses are *opposite* of those claimed. The Examiner acknowledges this relationship (*see, e.g.*, page 18 of the Office Action dated July 22, 2010), thereby implicitly admitting that the '455 reference teaches away from the asserted hypothetical embodiment. Applicant reminds the Examiner that "the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." M.P.E.P. § 2141.02 (*emphasis original*). The teachings of the '455 reference regarding

the relationship between breakdown voltage and the thickness of the insulator (the asserted parameter to be optimized) indicate that the thicker the insulator, the higher the breakdown voltage. The '455 reference further teaches a desire for a high breakdown voltage. Moreover, Applicant's specification indicates that aspects of the claimed invention directed to insulator thickness lead to unexpected results because "it might be thought that such low body thicknesses would result in problems of punch-through, but the field plate and the consequential reduced surface field effect raise the source-drain voltage at which punch-through occurs." For at least these reasons, the § 103(a) rejections are improper and should be withdrawn.

Applicant respectfully traverses the § 103(a) rejections because the cited combination of references lacks correspondence to the claimed invention. For example, none of the asserted references teach the claimed invention "as a whole" (§ 103(a)) including aspects regarding, *e.g.*, the thickness of the gate-field plate insulator being greater than or equal to the thickness of the field plate insulator. Because none of the cited references teaches these aspects, no reasonable combination of these references can provide correspondence to the claimed invention. As such, the § 103(a) rejections fail.

More specifically, the '455 reference fails to correspond to aspects of the claimed invention directed to the thickness of the gate-field plate insulator being greater than or equal to the thickness of the field plate insulator. In contrast, the '455 reference teaches that the insulator between buried electrode 17 and gate electrode 19 (second insulating film 18) has a thickness between 400 to 450Å, whereas the insulator (first insulating film 16) for buried electrode 17 has a thickness of 3000Å. *See, e.g.*, Figures 7-14A and Paragraphs 0037-0041. Thus, the insulator between buried electrode 17 and gate electrode 19 is substantially thinner than the insulator for buried electrode 17.

The cited '455 reference teaches away from the asserted modification by leading in a direction divergent from the path that was taken by Applicant. *In re Haruna*, 249 F.3d 1327, 1335 (Fed. Cir. 2001). The '455 reference teaches that the first insulating film 16 (*i.e.*, the asserted field plate insulator) is preferably thicker than the second insulating film 18 (*i.e.*, the asserted gate-field plate insulator), while the thickness of film 16 may be determined by a breakdown voltage and the thickness of film 18 may be determined by a threshold voltage. *See, e.g.*, paragraph 0031. The specific example thicknesses given by

the '455 reference indicate that film 16 should be substantially thicker than film 18 (*e.g.*, 3000Å versus 450Å). By expressly teaching that film 16 should be thicker than film 18 the '455 reference teaches a relationship directly opposite, and therefore divergent, from the thickness of the gate-field plate insulator being greater than or equal to the thickness of the field plate insulator, as in the claimed invention.

The cited '455 reference further teaches away from the proposed modification because the Office Action's proposed modification would render the '455 reference inoperable for its intended purpose. Consistent with the recent Supreme Court decision, *M.P.E.P.* § 2143.01 explains the long-standing principle that a § 103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main ('455) reference - the rationale being that the prior art teaches away from such a modification. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (U.S. 2007). ("[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be non-obvious."). Applicant submits that the combination would render the embodiment inoperable for its intended purpose because the '455 reference teaches that to achieve the desired performance regarding breakdown voltage and threshold voltage, the asserted field plate insulator has a thickness of approximately 3000Å and the asserted gate-field plate insulator has a thickness of approximately 450Å. Decreasing the thickness of the asserted field plate insulator below 450Å, for example, would result in a breakdown voltage well below the desired level for the asserted embodiment of the '455 reference. Under *M.P.E.P.* § 2143.01, the rejections cannot be maintained.

Further, the Office Action fails to provide proper motivation for the asserted modification. Under *M.P.E.P.* § 2143.01, "obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so." The Office Action's asserted motivation to modify the teachings of the '455 reference is to achieve desired device performance. However, the Office Action fails to disclose what the desired device performance one of skill in the art would modify the asserted insulators to achieve. The '455 reference does not disclose a desired breakdown voltage, threshold voltage, or relationship between breakdown and threshold voltage that would result in one of skill in

the art modifying the embodiments of the '455 reference in a manner that would result in the claimed invention. Specifically, the thickness of gate field plate insulator 18 and field plate insulator 16 are disclosed to provide the performance desired by the device of the '455 reference with respect to threshold voltage and breakdown voltage. *See* paragraph 0031 of the '455 reference. There is no teaching or suggestion in the '455 reference that changing the thickness in the manner asserted by the Office Action (*i.e.* decreasing the thickness of insulator 16 and/or increasing the thickness of insulator 18) would result in the performance desired in the device of the '455 reference. Rather, the '455 reference teaches that the thicknesses disclosed achieve the desired device performance with respect to breakdown voltage and threshold voltage. *See, e.g.*, paragraphs 0031 and 0100. Accordingly, the Office Action has failed to provide proper motivation for the modification to the '455 reference.

The Office Action's asserted motivation and arguments indicate that the Examiner is engaging in impermissible hindsight reasoning. Under M.P.E.P. § 2142, "impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." The '455 reference teaches that the desired performance of the reference's device is achieved by the asserted field plate insulator (first insulating film 16) being thicker than the asserted gate-field plate insulator (second insulating film 18). *See* paragraph 0031 of the '455 reference. The only evidence of the Examiner's desired device performance which leads to the claimed invention is found in Applicant's specification and claims. Accordingly, the Office Action has engaged in impermissible hindsight reasoning, and the § 103 rejections are improper and should be withdrawn.

Applicant further traverses the rejections because the cited portions of the '455 reference do not correspond to aspects of the claimed invention directed to the drift region having a steeply graded doping concentration, with the concentration increasing from the body region to the drain region (*e.g.*, the concentration is at least 50 times greater adjacent to the drain region than adjacent to the body region). Applicant's disclosure teaches benefits associated with having a steeply graded concentration gradient. *See, e.g.*, Paragraphs 0021-0022. However, the cited portions of the '455 reference provide no appreciation of or recognition for such benefits, and thus any

proposed modification would appear to be improperly based upon Applicant's disclosure. *See, e.g.*, M.P.E.P. § 2142. More specifically, the cited portions of the '455 reference simply teach that the impurity concentration of drift layer 12 increases toward the substrate 11. *See, e.g.*, Figure 2 and Paragraph 0053. The cited portions of the '455 reference do not provide any indication regarding the actual level of impurity concentration in drift layer 12 near well layer 13 relative to the actual level of impurity concentration in drift layer 12 near substrate 11, let alone teach that the doping concentration in the drift region has a steeply graded concentration gradient as in the claimed invention. Accordingly, the rejections are improper and Applicant requests that they be withdrawn.

Applicant respectfully traverses the § 112(2) rejections of claims 5, 6, 10 and 21. Applicant asserts that one of skill in the art would have understood what surface the claim was referring to in claim 5. Further, the cell pitch in claim 10 is an inherent feature of the pattern of cells. Notwithstanding, Applicant has amended claims 5, 10 and 21. Applicant respectfully requests the entrance of the amendments as they place the claims in better condition for appeal.

With respect to the claim objections to claims 15-18 and 21, Applicant has made appropriate corrections to address the informalities and requests that the objections be withdrawn.

In view of the remarks above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Juergen Krause-Polstorff, of NXP Corporation at (408) 474-9062 (or the undersigned).

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